

UTILITY MODEL NO. Sho 55-159304

RETROREFLECTIVE BRIGHT MOLDING

[Translated from Japanese]

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JAPANESE PATENT OFFICE (JP)  
UTILITY MODEL NO. Sho 55-159304

April 30, Sho 54

Utility Model Application

To: The Commissioner of the Japanese Patent Office

1. Title of Design

Retroreflective bright molding

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5. List of attachment:

- (1) Specification 1 copy
- (2) Drawing 1 copy
- (3) Copy of application 1  
copy
- (4) Powder of attorney  
1 copy

[Attached amendments have been incorporated in the text of this translation]

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## Specification

### 1. Title of design

Retroreflective bright molding

### 2. Claim of the design

A retroreflective bright molding having a structure where a cubic structural surface is formed on synthetic resin molding, and a metal reflective layer is further formed on the surface of the aforementioned cubic structural surface.

### 3. Detailed description of the design

The present design pertains to a retroreflective structure made of a synthetic resin molding.

In the past, a retroreflective structure (reflected light returns to the incident light position) having a cubic structure on the back surface of a transparent acrylic resin, etc. and the change in refractive index at the resin-air interface is utilized to return the reflected light toward the incident light direction is used for safety signs and reflective sheets, but the above-mentioned moldings are made of hard resins and damage occurs as a result of impact, and, as a result, it has not been possible to use them on the exteriors of vehicles such as bumpers and side moldings.

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Also, a reflective resin molding having the molding surface deposited with an aluminum foil has been known, but a reflective resin molding has not been known.

The purpose of the present design is to provide a retroreflective bright molding that can be mounted on a curved member through application of reflective properties to a flexible

synthetic resin moldings.

A summary of the present design is a retroreflective bright molding having a structure where a cubic surface structure is formed on a synthetic resin molding, and a metal reflective layer is formed on the surface of the aforementioned cubic surface structure.

A working example of the present design is explained with drawings below. Fig. 1 shows a cross-section of the molding, and cubic surface structure A is transferred to synthetic resin molding 1 made of a soft vinyl chloride, thermoplastic urethane, etc. extruded from an extruder using a transfer roll having a cube-corner structure, an optional base coating 2 is applied to the surface so as to increase leveling adhesion, metal reflective film 3 is formed on base coating 2 by means of deposition or sputtering; then, top coat 4 is applied to the surface of metal reflective film 3 as a protective film, and a retroreflective bright molding is produced.

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The aforementioned retroreflective bright molding is made of a flexible elastic material and is used on the surface of vehicles such as bumpers and side moldings as shown in Fig. 2. Furthermore, mounting is possible as a step mold, ramp mold, or luggage molding.

The retroreflective bright molding with structure as described above has a cubic structure on the resin molding surface and is made of a flexible resin; thus, damage does not occur as a result of external impact, and retroreflectivity is retained, and mounting can be done easily even on a curved surface such as the exterior of vehicles with double-coated tape, clips, bolts, and insertion means.

A working example of the retroreflective bright molding of the present design is shown below. In production of the aforementioned molding, extrusion molding of a thermoplastic polyurethane was done to form a molding, the cubic surface structure was transferred to the surface of the molding with a transfer roll having a cube corner structure, spray coating of the aforementioned surface was done with a two-component urethane paint at a ratio of

approximately 10  $\mu$ , forced heat drying was performed for 1.5 hours at 80°C, and then, sputtering of a nickel-chromium type alloy was applied to the aforementioned surface using a DC magnetron sputtering device to form a film thickness of approximately 250 angstroms.

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Furthermore, non-yellowing two-component urethane paint was applied to the surface as a protective film. The molding produced as described above exhibits superior performance as a retroreflective bright molding as shown by the test results in Table I below.

**Table I**

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Test Item	Conditions	Results
Metal film adhesion	Cross-cut adhesion test	No peels
Low-temp flexibility	-20°C, $\phi$ 15 mm	No cracks
Hot water resistance	80°C x 400 h	Normal
Heat-resistance	80°C x 400 h	"
Molsture resistance	50°Cx95%RHx400h	"
Abrasion resistance	Taper, 1000 times	"
Low-temp impact resistance	-20°C, 30 kgcm	"
Optical reflectivity	Light application, angle of incident 1/8 degrees	very good
Weather resistance	SWOM 400 h	Normal

In the working example above, formation of the cubic surface structure on the surface of the synthetic resin molding was done as extrusion occurred to form a molding and transfer roll having a cube-corner structure was used, but when a reverse cubic structure is formed on the die surface and injection molding is done, the cubic structure is transferred and the cubic structure can be formed on the surface of the synthetic resin molding as well. Furthermore, when a transparent synthetic resin is used for the molding main unit, the cubic structure may be provided

on the back surface of the molding main unit as well.

As explained in detail above, when a cubic structure is provided for the synthetic resin molding, a highly flexible retroreflective bright molding can be produced, and mounting of the molding can be easily achieved on a curved object, as well, and damage does not occur as a result of external impact, and retroreflectivity is retained, and thus, a highly economical and safe molding with a wide range of applications can be produced.

#### 4. Brief description of the figures

The figures show working examples of the present design; Fig. 1 is a cross-section view of the retroreflective bright molding, and Fig. 2 shows application of the molding to the exterior of a vehicle.

#### Explanation of codes

1 ... Synthetic resin molding

2 ... Base coat

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3 ... Metal reflective layer

4 ... Top coat

5 ... Bumper molding

6 ... Side molding

A ... Cubic structured surface

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Fig. 1

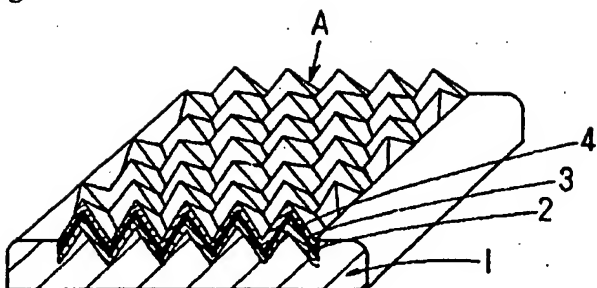
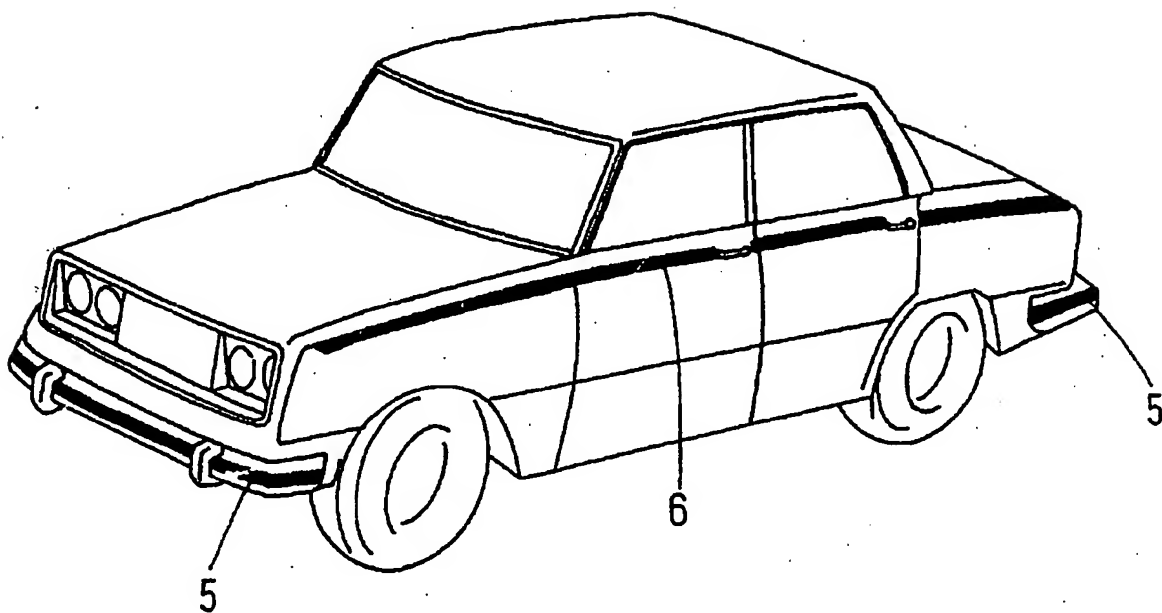


Fig. 2



Amendments

April 10, Sho 55

[Attached amendments have been incorporated into the text of this translation]